Before the

FEDERAL COMMUNICATIONS COMMISSION

Washington, D.C. 20554

In the Matter of	)	
	)	GEN Docket No. 90-314
Amendment of the Commission's Rules to	)	
Establish New Personal Communications	)	
Services	)	

PETITION FOR RECONSIDERATION

Omnipoint Corporation ("Omnipoint"), by its attorneys and pursuant to Section 1.429 of the Commission's rules, files this Petition for Reconsideration of the Memorandum Opinion and Order in the above-referenced docket.[1]

Introduction and Executive Summary

Omnipoint, in most regards, applauds and supports the issuance of the Commission's Memorandum Opinion and Order for PCS. The rules for Licensed PCS in the Report will, for the most part, rapidly propel the implementation of a new and innovative communications system in the United States and, potentially, for a large part of the world.

While Omnipoint concurs with most of the rulings in the Memorandum Opinion and Order in the instant preceding, it has concerns about two specific technical issues:

---

1 The Memorandum Opinion and Order, GEN Docket No. 90-314, FCC 94-144 (released June 13, 1994) ("M O & O") was published in the Federal Register on June 24, 1994. 59 F.R. 32830 (June 24, 1994). On July 22, 1994 the Commission revised its rules and will publish those revisions in the Federal Register. Erratum, GEN Docket No. 90-314 (released July 22, 1994). Given that the Erratum significantly impacted on Omnipoint's reconsideration position and the full impact of the rule revisions have not been thoroughly reviewed, we believe it is reasonable for Omnipoint to be permitted to supplement this petition, if necessary, on further review of the Erratum rule changes. 47 CFR § 1.429(d) (parties are permitted 30 days after public notice of rulemaking decisions to file petitions for reconsideration.)

- Unlicensed Isochronous Frame Period

The Listen Before Talk time window used for call set-up should be increased from 10 milliseconds to 20 milliseconds. This provides for significant benefits to the consumer and has no adverse affect on any other unlicensed system.

- Part 24.238 Emission Limits for Licensed PCS.

The emission limit specifications for licensed PCS do not address Out of Band Emissions. Emission limit specifications need to differentiate between Spurious Emissions and Out of Band Emissions. An ideal guide exists in the Unlicensed PCS rules. As detailed below, Omnipoint proposes a measurement methodology which works for all PCS systems, greatly facilitates development of interoperable systems, and simplifies the FCC's task of measuring and monitoring compliance.

Unlicensed PCS:

The Commission was inundated with varying opinions regarding Unlicensed PCS operation and the respective governing rules. But virtually all of the debate still assumed that there would be 40 MHz for all Unlicensed PCS. Unfortunately, the primary changes that helped meet the Licensed PCS goals came at the expense of the Unlicensed band allocation. First, the total amount for Unlicensed was cut in half, a reduction of 20 MHz. Second, all of the spectrum originally allocated for wideband Isochronous systems (i.e., up to 5 MHz) was eliminated. This is not a minor change. In particular, the majority of companies manufacturing Unlicensed isochronous devices for 1.9 GHz were completely shut out.

Because of the suddenness of the proposed elimination of all wideband Unlicensed isochronous systems due to the reduction of all Unlicensed spectrum, we respectfully request that the Commission consider one crucial compromise which, coupled with obvious reductions to wide band Isochronous systems, will at least allow for interoperability between Licensed and Unlicensed systems and allow the use of advanced

vocoders. In order to support the standardization of technology, facilitate interoperability between Unlicensed and Licensed operation, and allow for the use of the 1994 generation of vocoders from multiple vendors which require 20 msec. frame times, both of which offer prime benefits to the consumer, Omnipoint suggests the following:

1.) Unlicensed Frame Period should be extended to 20 msec.

The choice of the frame period of 10 msec./X, where X is a whole number, unnecessarily precludes the use of all advanced vocoders which require 20 msec. frame periods. The divisor allows for additional technologies utilizing smaller frame periods but disallows a 20 msec. frame period, even though a 20 msec. frame period does not adversely affect the other technologies.

Omnipoint strongly proposes that the frame period be 20 milliseconds/X where X is a positive whole number. This modification will not adversely affect any other technology proposed for the unlicensed PCS operation. No systems are excluded or precluded from operation in the allocated Unlicensed spectrum based on this proposed change.

The benefits of 20 msec. frame period include the use of advanced vocoding and significantly improved throughput and slot time efficiency.

Advanced vocoders include typical coding rates of 8 and even 4 kbps. Many are based on technology only released from multiple research labs in the past 12 months and show remarkable improvement over prior methods. The Omnipoint technology 8 kbps codebook excited linear predictive (CELP) type of vocoder offers mean opinion scores (MOS) that are on or above par with the 32 kbps ADPCM types that have been commonly promoted for Unlicensed equipment. These advanced vocoders require 20 msec., but are more efficient frame periods than yesterday's designs.

The efficiency of a longer frame period is found in two major areas. The first is based on a greater throughput in the system, 8 kbps vocoding versus typical 32 kbps

vocoding provides a 4:1 improvement in efficiency. This benefit can be realized by allowing more users per system, thus reducing the cost of operation, while still being able to aggregate bandwidth for data applications. A maximum of 10 msec. effectively mandates the use of older vocoders which reduces available resources for other users and applications.

The second improvement in efficiency is based on a reduced amount of guard time as a percentage of loop time. The less required guard time that is associated with a loop, translates into additional resources for the end users and applications. Systems employing small frame periods inherently use a greater proportion of the loop as guard time just to keep the system functional.

Omnipoint agrees with the 15 members of PCIA Technical and Engineering committee regarding the need to "modify the 10 millisecond ("ms") period specified in the listen-before-talk ("LBT") rule, and corresponding frame time, to 20 msec. to permit the widest range of present and future technologies to operate in the unlicensed band in the most equitable manner".[2] Not only will the 20 msec. frame period help to avoid time/spectrum collisions by increasing the LBT monitoring, but will permit a greater range of technologies utilizing the unlicensed band.

The modification of a frame period from 10 msec./X to 20 msec./X will not technically limit or otherwise cause problems for systems subscribing to a short frame period. This is borne out by the arguments against increasing the frame period, all are based on a claim of "longer call setup time"[3]. But, the benefits of a 20 msec. frame period, including advanced vocoders and the 4:1 efficiency gains, far outweigh the 1/100 of a second additional delay in a call setup. Indeed, considering that this delay would be

---

2 Telocator Petition for Reconsideration(p 19, sec VII)

3 MO&O, para. 234, pp. 90.

undetectable to any user, the only arguments against allowing 20 msec. frame periods seem frivolous.

Omnipoint recommends that the Commission modify 15.323 (e) as follows:

> "The frame period (a set of consecutive time slots in which the position of each time slot can be identified by reference to a synchronizing source) of an intentional radiator operating in these sub-bands shall be 20 milliseconds/X where X is a positive whole number. Each device that implements time division for the purposes of maintaining a duplex connection on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 50 parts per million (ppm). Each device which further divides access in time in order to support multiple communication links on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 10 ppm. the jitter (time-related, abrupt, spurious variations in the duration of the frame interval) introduced at the two ends of such a communications link shall not exceed 25 microseconds for any two consecutive transmissions. Transmission shall be continuous during the frame period defined for the device."

The minor modification we are now proposing to the Unlicensed rules will allow Licensed/Unlicensed interoperable capability and will not restrict any other technology in the process, which provides a better service offering to the consumer.

Omnipoint would like to congratulate the Commission with regard to its adoption of an improved "Packing Rule."[4] This text is referred to as the "packing rule" because it initiates user searches for available spectrum in a logical and methodical fashion The previous requirement for starting a search on the band edges induced initiating duplex connection difficulties, and gratefully, the Commission has resolved this with an improved rule.

---

4 47 C.F.R. § 15.233(b).

We also urge the Commission to allow interested parties to demonstrate the ability of certain wideband systems per the Memorandum Opinion and Order statement in paragraph 236, page 91. In particular, we ask that after the Commission has had a chance to evaluate these systems benefits, to remain open to compromises on maximum bandwidth under certain operating conditions.

Licensed

As described in Part 24.238 Emission Limits, the use of a 1 MHz resolution bandwidth of a measurement instrument causes even a CW carrier in the middle of a 5 MHz license to fail the -43 + 10log10 (P) decibels test. Therefore, any modulated signal will certainly fail this test. Narrowband Spurious Emissions near the channel under test may not be detected with this resolution bandwidth, since any modulation of the carrier will certainly mask these signals. Surely this is not the Commission's intent.[5]

Fortunately, the optimal method for dealing with this issue is to use the same rules already adopted by the FCC for the Unlicensed band for Out Of Band Emissions, and use the existing Part 24.238 rules for Spurious Emissions. Therefore, we recommend that the same rule already used for the measurement of Emission Bandwidth (Part 15.303) described in the Unlicensed isochronous band, be used in the licensed bands. The 1% measurement bandwidth not only is a good method for measurement, but it also allows for much easier development of interoperable licensed and unlicensed PCS devices. If approximately 1% of the maximum possible Emission Bandwidth is used for the measurement, not only a CW carrier but all properly implemented PCS systems will pass the Part 24.238 Emissions Limits for Spurious Emissions. Attached spectrum analyzer data shows a CW signal under both measurement techniques. Note the presence of a narrowband spurious signal present in spectrum analyzer plots, figure 1 and figure 2. In

---

5 MO&O, at n.299.

figure 1, the 1 MHz resolution bandwidth case, this spur is not visible at all and thus would erroneously pass inspection. However, in figure 2, using Omnipoint's proposed measurement technique the spurious signal is quite visible and would be caught.[6]

A Modulation Mask defined for the isochronous unlicensed PCS devices in 47 CFR Ch. 1 Part 15.323 (d), Amended July 22, 1994, can be used as the guideline which will facilitate interoperability between the unlicensed and licensed bands. By defining a similar mask for the licensed and unlicensed bands, the FCC's ability to measure and monitor Out Of Band Emissions will be greatly simplified. A similar Modulation Mask should be defined to specify acceptable emissions for Licensed PCS devices.

It is strongly recommended that a mask be adopted that allows constant envelope digital modulations to operate in the band, to ensure that low cost implementations of PCS equipment are able to be deployed into both the unlicensed and licensed bands. Since the FCC has adopted a policy of not channelizing the frequency spectrum within a particular PCS licensed frequency band, various modulation and channelization schemes will likely result. As a consequence, different channel bandwidth schemes will result in the need for the FCC to specify Out of Band Emissions separately from Spurious Emissions, since Out Of Band Emissions are dependent on the specific PCS system's modulation techniques and modulation rates. The Out of Band Emissions specification should be defined in terms of the Emission Bandwidth as measured in Part 15.303 (c). Part 15.323 (d), Amended July 22, 1994, establishes such a mask for isochronous Unlicensed PCS devices. We recommend that the Commission adopt the following mask for Licensed PCS devices:

---

6 For this research, Omnipoint used the Commission's definitions of the terms "Spurious Emission," "Necessary Bandwidth," and "Out of Band Emissions," as stated 47 C.F.R. § 2.1, and "Emission Bandwidth," as stated in 47 C.F.R. § 15.303(c).

24.238 Emission Limits

(a) The fundamental emission of the transmitter shall be located as close to the edge of the Licensed band as the transmitter is designed to operate. This is designated as B/2, or one half the Channel Bandwidth, B, for this subpart. The Emission Bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency, and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Compliance with the emission limits is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the Emission Bandwidth of the device under measurement. B shall not be less than the Emission Bandwidth of the device. Out of Band Emissions shall be attenuated below an unmodulated carrier power as follows: 30 dB between the channel edges and 1B above or below the channel; 50 dB between 1B and 2B above or below the channel; and 60 dB at 2B or more above or below the channel edges, or 43 + 10log10 (P) decibels, whichever is the lesser attenuation. Spurious Emissions outside a licensee's frequency block shall be attenuated below the transmitter power in Watts (P) by at least 43 plus 10 log10 (P) decibels, or 80 decibels, whichever is the lesser attenuation. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater.

Conclusion

Omnipoint strongly encourages the Commission to consider the proposed rule changes to the Unlicensed Frame Period and the Licensed Emissions sections of the PCS rules. The proposed changes are in support of the Commission's effort to constructively

regulate the Emerging Technologies and offer the consumer "state of the art" communications.

Respectfully submitted,

OMNIPOINT CORPORATION

Mark J. Tauber
Mark J. O'Connor

Piper & Marbury
1200 19th Street, N.W.
Seventh Floor
Washington, D.C. 20036
(202) 861-3900

Its Attorneys

Date: July 25, 1994

FIGURE 1

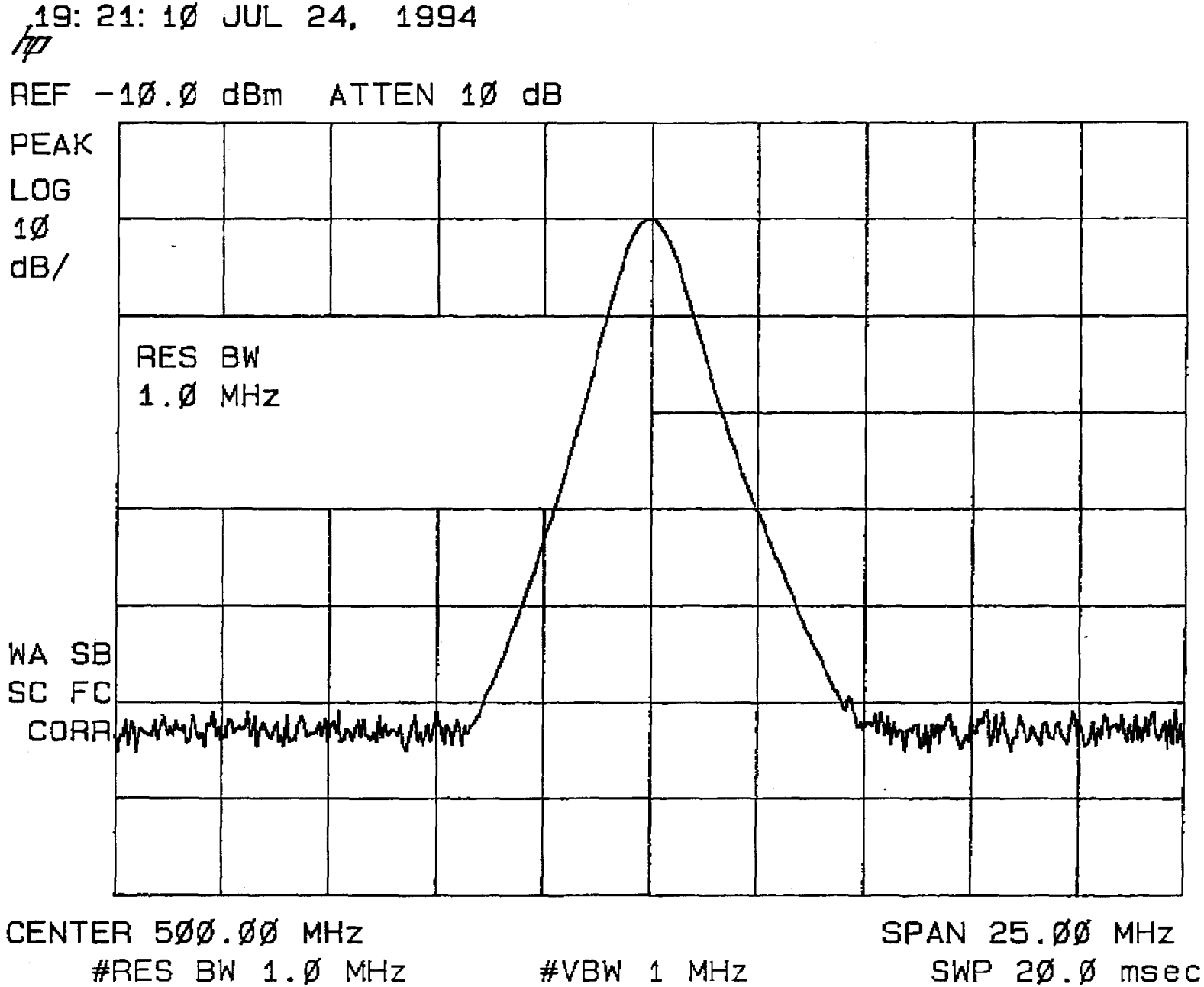

FIGURE 2